How Can I Predict Network Behavior to Provide for an Exceptional Customer Experience?

ca technologies®

When used with Netrounds Active Testing, Network Operations and Analytics from CA Technologies can validate the dynamic creation and changes of network services in automated SDx and public cloud environments. Together with live full stack network monitoring and added synthetic insights, this powerful integrated approach actively tests and monitors pre-production and production deployments for predictive network behavior and validation to help maximize the customer experience.

Executive Summary

Challenge

The digital age demands that network services work when delivered. But unlike traditional networks with fixed deployments and predictable behavior, modern elastic networks based on software–defined everything (SDx) and public cloud are extremely unpredictable, with constant change, relocation and expansion.

Opportunity

Network monitoring analyzes network behavior by capturing live traffic and data. Active testing analyzes network behavior by injecting test data. By injecting synthetic network traffic into newly created services that can simulate the customer experience, combined with intelligence from network performance and fault monitoring of live data, customers can gain a new level of assurance. With the ability to automatically deploy active tests anywhere in private network or public cloud and tests that can model specific applications and behavior, you now have a unique combination of capabilities to help assure modern networks. At a time when the only thing we can predict about SDx technologies is constant change, the opportunity to be able to predict the condition of modern network architectures that host critical customer services should not be overlooked.

Benefits

Predictive network behavior is a prerequisite for deploying and managing modern network architectures. Before turning over services to your customers, you should have confidence in how your SDx and cloud networks will behave. When integrated with Netrounds Active Testing, Network Operations and Analytics from CA Technologies can validate the network behavior in automated SDx and hybrid cloud environments. Together with full stack network monitoring and added synthetic insights, these powerful integrated capabilities will only enhance operational analytics and intelligence with network teams to more consistently deliver an exceptional customer experience.

Section 1:

The Challenge: Unpredictable Modern Network Architectures

Most, if not all, companies expect software-defined networking (SDN) and cloud technologies to enable fast service delivery at a cheaper price. While these are amazing benefits to a network industry that is used to expensive, static environments with long provisioning lead times, it doesn't do the consumer any good if a digital service doesn't perform as expected when ordered.

Deploying new services based on cloud and modern network architectures comes with a new level of complexity for network operations, as well as network monitoring software. Cloud and SDN enable infrastructures to become agile enough to feed consumer demand for constant access to applications, data and bandwidth, but network monitoring needs to become just as agile to discover, visualize, identify, scale and predict to meet the constant rate of change within these dynamic architectures.

Additionally, service delivery on top of modern network infrastructures requires validation prior to and at the time of deployment via active testing of real-world traffic patterns, along with live monitoring across all the layers of the new SDN network stack, identifying bottlenecks and validating service level agreements (SLAs), all while doing it from the end-user perspective.
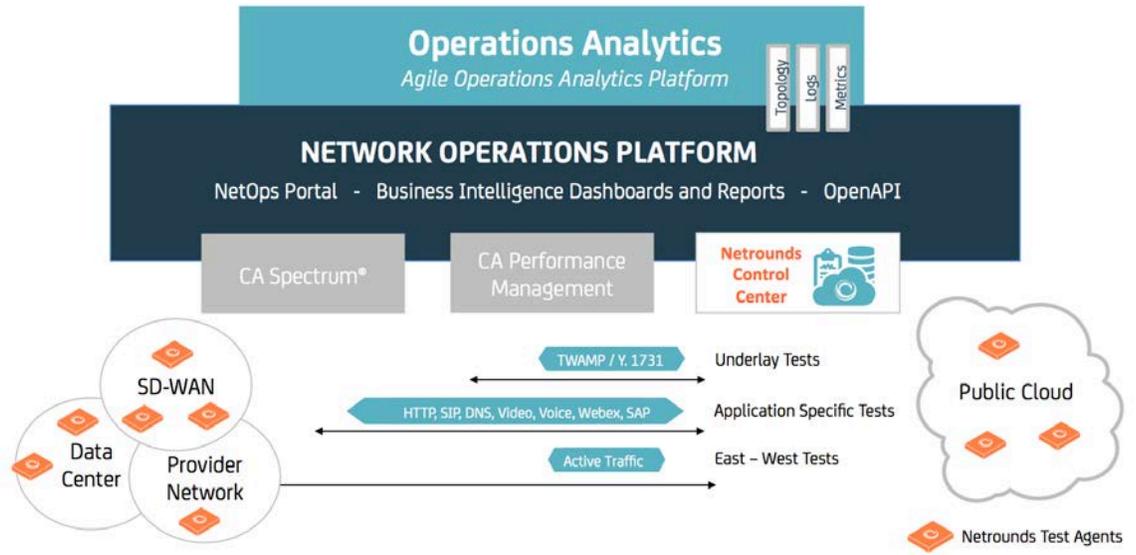
Section 2:

The Opportunity: Active Testing and Live Monitoring for Predictive Network Behavior

Netrounds Active Testing, when used with Network Operations and Analytics from CA Technologies, offers a comprehensive and scalable real-time view of network behavior and end-to-end network service quality. The combined network operations and analytics capabilities act as the umbrella full stack fault and performance monitoring system and monitor networks, servers and application performance using passive techniques. Netrounds adds active test results and continuous monitoring KPIs for network services to the overall network and service health picture. This combination of active service data and passive infrastructure performance metrics is designed to create a comprehensive end-to-end view of network service quality from the end-users' perspective, based on predictive network behavior as well as inventory, topology, faults, flow and packet analysis converted into actionable intelligence for network operations.

Figure 1.

CA and Netrounds integrated active testing solution architecture overview

Network Operations and Analytics from CA Technologies collects resource–centric fault and performance monitoring data and uses agnostic, multi–vendor data collection methods from physical, virtual and logical network devices and applications. These metrics are then aggregated and presented in network operations dashboards.

With Netrounds, two components are added:

1. Netrounds Control Center with relevant feature packs
2. Netrounds Test Agents with active traffic generation capabilities

Netrounds Control Center provides a graphical designer environment for developers to build testing and monitoring templates. The Control Center also manages the Test Agents, from controlling coordinated tests and collecting test results to general software management.

All testing and monitoring activities are performed using traffic–generating Netrounds Test Agents remotely deployed in strategic locations across your network. Test Agents may be preinstalled and shared in central locations, and they can also be deployed dynamically at SD–WAN end points.

An example of a simple deployment scenario involves centrally located Test Agents. These act as initiators for test traffic that is directed toward embedded reflectors in existing network devices deployed in your network. These traffic reflection methods are based on the Two–Way Active Measurement Protocol (TWAMP) and Y.1731 standards.

Test Agents also interact with existing server applications as they generate synthetic services such as HTTP, DNS, VoIP and HTTP Live Streaming Video.

For more extensive test and monitoring capabilities, Test Agents can be deployed on compute nodes at the SD–WAN end point locations. Deployment can be orchestrated at service provisioning and re–provisioning time to enable agile and fully automated active assurance.

Netrounds Test Agents possess a NAT and FW–friendly call–home feature so that they are automatically discovered and configured by the Netrounds Control Center and immediately available in the Network Operations and Analytics platform from CA Technologies upon reaching a network connection.

Figure 2.

Netrounds agents managed within the CA platform.

Use Cases:

SD–WAN and WAN monitoring

Netrounds' software–based Test Agents generate active traffic to validate and monitor service KPIs between SD–WAN end points or distributed branch offices. The small footprint of Netrounds Virtual Test Agent (vTA) virtualized network functions (VNFs) allows them to be easily deployed at each remote end point location to perform extensive, distributed measurements of end–user quality in real time.

Upon quality degradations or SLA threshold violations for your monitored services, Netrounds will immediately trigger an alarm and notify key stakeholders for proactive problem resolution before end–users start to experience problems. The passive, resource–oriented metrics already collected and available in the Network Operations and Analytics platform are now a valuable source of information to assist in troubleshooting and root cause analysis of the underlying problem indicated by Netrounds. To gain additional assistance in troubleshooting, the CA solution can also trigger automated test cases via Netrounds to sectionalize the problem and understand the network layer and domain that the problem corresponds to.

Programmable test capabilities in Netrounds can also be used to automatically validate dynamic service changes. For example, in the case of a reroute event, Test Agents are instructed to execute a test that validates that the technical SLA is met with the new route.

Figure 3.

Netrounds active
testing and
monitoring across
multi–national
SD–WAN branches
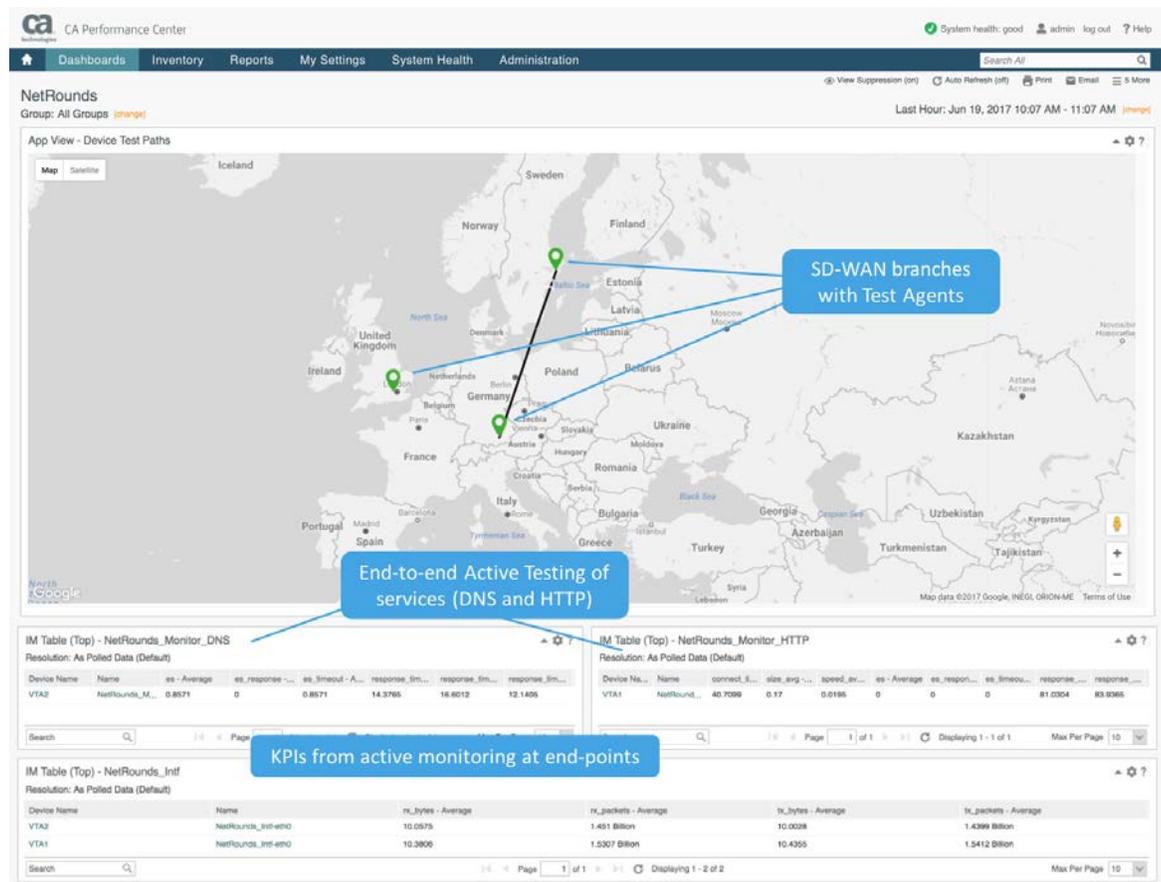
Cloud workload and service chain monitoring

In cloud environments, the vital network functions are deployed as a chain of VNFs in the data center. Monitoring of a service chain must be done in two layers:

1. Passive monitoring of resources like CPU, memory and disk utilization. This is performed by Network Operations and Analytics from CA Technologies.

2. Active testing and monitoring of the data plane functionality. Netrounds adds this capability to the CA solution.

Figure 4 illustrates a visualization example from the Network Operations and Analytics UI in which a service chain comprising of a virtual load balancer (vLB) and a vCache includes two Netrounds Virtual Test Agents (vTA VNFs), one at each end of the service chain. These Test Agents are critical at two different stages:

1. During service turn–up, Test Agents perform a service activation test to verify that the service chain delivers the promised performance across the data plane.

2. During ongoing operation, Test Agents continuously and actively monitor the functionality and performance of the service chain.

During ongoing operation, CA Technologies and Netrounds monitor the service chain from both a resource-oriented and data plane point of view. Comprehensive, end-to-end service chain health and performance is aggregated by the combined Network Operations and Analytics capabilities.

Similar to the SD-WAN use case, any run-time changes to the service chain or potential threshold violations will automatically trigger a troubleshooting test case executed by Netrounds.

Figure 4.

Network Operations and Analytics dashboards mapping and displaying service chain topologies including Netrounds Test Agents.
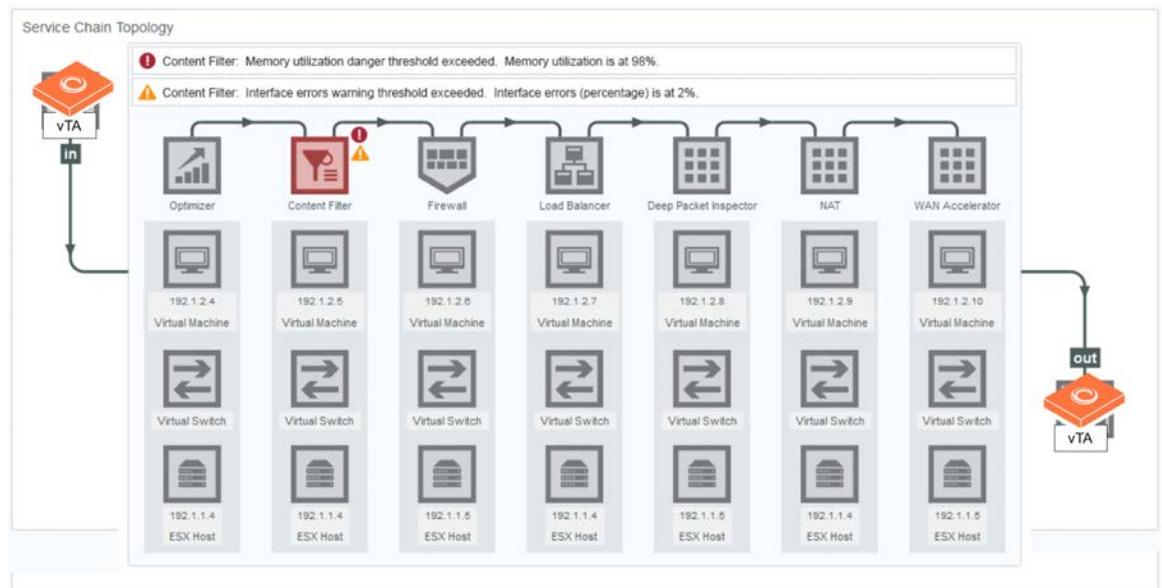
"Vosko is excited to be working with CA and its partners to deploy managed services of software defined networks. CA Performance Management integrated with best-of-breed fault management and innovative relationship-based SDN assurance is enabling Vosko to service customers in the Netherlands who need help managing SDN networks."

– Rob van der Weijden, Manager of Managed Services, Vosko Networking

"CA addresses the hottest software-defined networking technology today. Nearly 88 percent of enterprises either currently deploy SD-WAN or plan to do so within the next 12 months. With the integration of fault, device, flow and packet analysis, CA Technologies delivers a comprehensive approach to unified monitoring and analytics of SD-WAN and legacy WAN technologies."

– Shamus McGillicuddy, Senior Analyst, Enterprise Management Associates

Section 3:

The Benefits: Netrounds Added Value to Network Operations and Analytics from CA Technologies

Predicting network behavior in agile modern network architectures brings a new level of assurance to network operations teams who expect SDx technologies to better equip them to compete in the digital age. The integration of Netrounds Active Testing and Network Operations and Analytics from CA Technologies provides the following benefits to our customers:

- **Agile deployments.** Can be deployed anywhere, versus fixed network appliances in specific locations.

- **Automated testing.** Deployments are tied to when services are created or workloads move to cloud environments.

- **Application-driven.** Testing can mimic real-world applications.

Features	Benefits
Event-driven test deployments	Automated testing triggered through CA Spectrum and CA Performance Management (Network Operations and Analytics platform components)
Complement live network monitoring with Active Tests	Correlate performance and fault from CA Spectrum and CA Performance Management with active performance and fault testing
Single network operations user interface (UI)	Analyze active results via familiar CA Spectrum and CA Performance Management workflows
Enriched operational analytics with active metrics	Compliment analytics with active network behavior predictions

Section 4:

Conclusion

Comprehensive end-to-end assurance capabilities for modern network service delivery should always integrate active testing with full stack monitoring and analytics for advanced, real-world predictions into network behavior. Active testing from Netrounds validates the dynamic creation of network services in automated SDx environments before customers do it themselves. When used with Network Operations and Analytics from CA Technologies that includes CA Performance Management and CA Spectrum enhanced by CA Virtual Network Assurance, faulty or compromised network components and layers can be identified well before a service is deemed customer-ready, protecting SLAs, the company brand and, most importantly, the customer experience.

Network Operations and Analytics from CA Technologies is a big data network monitoring platform with full stack analytics for assuring traditional and software-defined networks. The solution converts inventory, topology, device metrics, faults, flow and packet analysis into actionable intelligence for network operations teams.

For more information, please visit ca.com/netops.

Netrounds is an active network analytics solution provider for physical, hybrid and virtual networks. Netrounds' programmable, software-based test and service quality monitoring capabilities enable telecom operators and service providers to enhance the end user experience of IP-based services such as internet, TV, voice and other quality-demanding business services. More than 250 network operators, service providers and enterprises use Netrounds solutions worldwide.

For more information, please visit netrounds.com.

ca technologies®

Connect with CA Technologies at ca.com

CA Technologies (NASDAQ: CA) creates software that fuels transformation for companies and enables them to seize the opportunities of the application economy. Software is at the heart of every business, in every industry. From planning to development to management and security, CA is working with companies worldwide to change the way we live, transact and communicate – across mobile, private and public cloud, distributed and mainframe environments. Learn more at ca.com.